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Nanomanufacturing – Key control characteristics – Part 8-2: Nano-enabled metal-oxide interfacial devices – Test method for the polarization properties by thermally stimulated depolarization current

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NANOMANUFACTURING – KEY CONTROL CHARACTERISTICS –

Part 8-2: Nano-enabled metal-oxide interfacial devices – Test method for the polarization properties by thermally stimulated depolarization current

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62607-8-2, which is a Technical Specification, has been prepared by IEC technical committee 113: Nanotechnology standardization for electrical and electronic products and systems.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
113/539/DTS	113/562/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62607 series, published under the general title *Nanomanufacturing – Key control characteristics*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Thermally stimulated depolarization current (TSDC) measurement has been a widely used method for acquiring information about electric polarization phenomena of various materials such as dielectrics, ferroelectrics, semiconductors, ceramics, plastics, and other organic materials for the past several decades. Recently, TSDC measurement became recognized as a powerful tool to evaluate polarization and depolarization, relaxation time, charge-storage and activation energy in advanced electronic materials including nano-enabled materials and devices. Accordingly, a standardized protocol for TSDC measurement will be useful to add validity to the experimental data for the purposes of productization of nano-enabled materials and devices. The reference sample for the reproducible TSDC measurement is also important.

This document offers a measurement method to be developed for determining polarization properties of metal-oxide interfacial devices using TSDC.

NANOMANUFACTURING – KEY CONTROL CHARACTERISTICS –

Part 8-2: Nano-enabled metal-oxide interfacial devices – Test method for the polarization properties by thermally stimulated depolarization current

1 Scope

There are two types of thermally stimulated current (TSC) measurement methods, classified by the origin of the current. One is generated by the detrapping of charges. The other one is generated by depolarization. The latter is frequently called thermally stimulated depolarization current (TSDC). This part of IEC 62607 focuses on the latter method, and specifies the measurement procedures to be developed for determining polarization properties of metal-oxide interfacial devices.

This document includes:

– outlines of the experimental procedures used to measure TSDC,
– methods of interpretation of results and discussion of data analysis, and
– case studies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 80004-1, *Nanotechnologies – Vocabulary – Part 1: Core terms*